



**DEPARTMENT OF COMPUTER SCIENCE &
ENGINEERING**

**NATIONAL INSTITUTE OF TECHNOLOGY
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CS34143 Introduction to Programming Using Python

L-T-P-Cr: 3-0-0-2

Pre-requisites: Introduction to computing

Course Objectives:

1. To learn basic programming concepts of Python.
2. To familiarize and use libraries for string manipulation and user-defined functions.
3. To get familiar with in-built data structures (namely Lists, Tuples, Dictionary, and File handling) in Python.
4. To work with files/databases using Python.
5. To understand the fundamental principles of object-oriented programming and to develop applications using Python.

Course Outcomes:

CO1: Recall basic concepts of Python.

CO2: Understanding Python string handling techniques and user-defined functions.

CO3: Apply data structures like lists, tuples, dictionaries, and many more.

CO4: Handling files and regular expressions using Python.

CO5: Choose appropriate object-oriented programming techniques to solve real-world problems.

CO6: Design and develop applications using Python.

CO-PO Mapping:

COs	PO1 (Engineering knowledge)	PO2 (Problem analysis)	PO3 (Design / development of solutions)	PO4 (Conduct investigations of complex problems)	PO5 (Modern tool usage)	PO6 (The engineer and society)	PO7 (Environment and sustainability)	PO8 (Ethics)	PO9 (Individual and teamwork)	PO10 (Communication)	PO11 (Project management and finance)	PO12 (Life-long learning)
CO1	H	L	L	L	L	L						

CO2	H	L	L	L	L	M					L	
CO3	H	M	M	M	M	M						
CO4	H	H	H	M	H	H						
CO5	H	H	M	H	H	H					M	
CO6	H	M	H	L	H	H			H		H	

(H-High Relation, M-Medium Relation, L-Low Relation)

Syllabus

UNIT I: Introduction

Lectures: 8

History, Features, Working with Python, Installing Python, Basic python syntax, Interactive shell, Editing, Saving and running a script. Tokens: Keywords, Identifiers, Literals, Operators, Data types; Variables, Immutable variables, Numerical types, Operators and Boolean expressions, Debugging, Comments in the program, Understanding error messages, Built-in functions: type(), id(), eval(), random, chr(), ord().

UNIT II: Condition Control Structures and Input Output

Lectures: 8

Conditional Statements: If, If-else, Nested if-else; Loops: For, While, Nested loops; Control statements: Break, Continue, Pass; Input and output: Taking input from the user through a keyboard, Manipulation of input, Formatted input, Formatted output.

UNIT III: Function and Strings

Lectures: 8

Functions in Python: Defining a function, Calling a function, Types of functions, Function Arguments, Global and local variables.

Strings: Single quoted, double quoted and triple quoted, String manipulations: Subscript operator, Indexing, Slicing a string, Strings and number system: Converting strings to numbers and vice versa.

UNIT IV: Lists, Tuples and Dictionaries

Lectures: 8

Basic List operators, Iterating over a list, Replacing, Inserting, Removing an element; Searching and sorting lists, Calculating the sum and average of items in a list; Tuples: Sequence of values, Immutability, Comparing tuples, Tuple assignment; Dictionary: Store data as key-value pairs in dictionaries, Search for values, Change existing values, Add new, Key-value pairs, and Delete key-value pairs, Nesting Objects, Sorting, Dictionary literals, Adding and removing keys, Accessing and replacing values; Traversing dictionaries.

UNIT V: Files, Regular Expressions, and Modules

Lectures: 4

Reading/writing text and numbers from/to a file in .TXT file and .CSV files; Regular expressions, importing and creating modules: Manipulating files and directories using OS module.

UNIT VI: Object Oriented Programming and Database Connectivity

Lectures: 4

Class, Objects, Class variables, Instance variables, Types of methods, Inheritance, Database connection, Use of queries to retrieve data from database

Text Book:

1. A. B. Downey, "Think Python: How to Think Like a Computer Scientist", O'Reilly, 2nd edition, 2016.
2. T. Gaddis, "Starting Out with Python", 4th edition, Pearson, 2017.
3. L. Y. Daniel, "Introduction to Programming Using Python", Pearson, 2017.

Reference Books:

1. C. Dierbach, "Introduction to Computer Science Using Python: A Computational Problem-Solving Focus", Wiley, 2015.
2. Y. Kanetkar, "Let Us Python", BPB Publishers, 2019.

Suggested List of Experiments

1. 1. Write a python program to demonstrate different number datatypes in python
2. Write a python program to find the factorial of a number using recursion
3. Write a python program to calculate a patient's hospital bill. There must have the following methods in the program:

Patientdetails(): This method assigns a patient's details.

ShowPatient(): This method is used to show the details of the patient.

Bloodneed(): This method gets active if the patient needs blood, and it is used to calculate the bill (use different rates for different blood groups).

Treatment(): It is used to specify the type of treatment. There would be different rates for different treatments.

Discount(): This method is used to give a discount based on age. If the patient is a senior citizen, the discount would be 20%.

showBill(): It is used to calculate the final bill.

4. Write a python program to calculate the Sum of squares of first n natural numbers.
5. Write a python program that iterates the integers from 1 to 50. For multiples of three, it should print "Three" instead of the number (i.e., 3), and for multiples of five, it should print "Five" instead of the number (i.e., 5). For numbers, which are multiples of both three and five, print "ThreeFive"
6. Write a python program to print all numbers in a range divisible by a given number.
7. Write a python program to construct the following pattern using nested for loop

```
*  
**  
***  
**  
*
```

8. Write a python program that accepts the lengths of three sides of a triangle as inputs. The program should indicate whether the triangle is a right-angled triangle (use Pythagorean theorem).
9. Write a python program to print the date and time for today, add some days to your present date, and print the added date.
10. Write a python program to count the frequency of words appearing in a string using a dictionary.
11. Write a python program to create an array of 5 integers and display the array items. Access individual elements through the indexes.
12. Write a python program to put even and odd numbers of a list into two different lists.
13. Write a python program to create a list of tuples with the first element as the number and the second element as the square of the number.
14. Write a python program to check if a specified element presents in a tuple of tuples.

Original list: (('Red', 'White', 'Blue'), ('Green', 'Pink', 'Purple'), ('Orange', 'Yellow', 'Lime'))

Check if White present in said tuple of tuples!

True

Check if White present in said tuple of tuples!

True

Check if Olive present in a said tuple of tuples!

False

15. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be written into the second file.
16. Write a python program that inputs a text file. The program should print all the unique words in the file in alphabetical order.
17. Write a python program to search some literals strings from a given string "The five boxing wizards jump quickly". Searched words: 'jump', 'boxing'.
18. Write a python program to read a . CSV file using the panda's module and print the first and last two lines of a file.
19. Write a python program to perform addition using functions with the PDB module.

Suggested List of Projects

1. Develop an application using Python programming language to store and display our monthly expenses.
2. Develop an application using Python to detect online payment fraud.
3. Write a program using Python to predict the stock market.
4. Develop an application using Python to predict any diseases.
5. Develop an application using Python that shows analysis reports of Amazon Reviews for a specific period.